BB CW#33H

Name: Answer Key TP: ___

CW#38H: Two Column Proofs
Honors Geometry

CRS	Geometry Content
Objective	5.9 Write a two column proof

Think of writing a proof like solving a crime. You survey the crime scene, gather the facts, and write them down in your memo pad. To solve the crime, you take the known facts and, step by step, show who committed the crime. You conscientiously provide supporting evidence for each statement you make. We are not trying to "find an answer", but rather a process for which allows us to prove that something is in fact, true.

First, the blank structure of a proof should look like this:

Given: Known Information
Prove: Something something

Statement	Reason
Known Information	Given
(fact #1)	(why the fact #1 is true)
(fact #2)	(why the fact #2 is true)
(fact #...)	(why the fact #... is true)
Something something	
QED or □	

The proof should *end* with what you are trying to prove

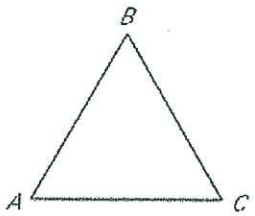
You can end your proof with QED, latin for *"Quod erat demonstrandum"* which means *"Which was needing to be proved"* It lets the reader know that something has been definitively proven. You can also draw a box: |

Postulate: statements that are assumed to be true w/out proof (a line contains two points)

Theorem: can be proved from definitions, postulates or previously proved theorems (ex- Pythagorean theorem)

*Record all postulate and theorems on yellow handout!

Example 1:
GIVEN: $m\angle A = m\angle B$, $m\angle B = m\angle C$
PROVE: $\angle A \cong \angle C$



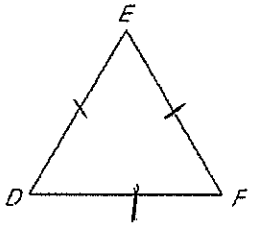
Statements	Reasons
1. $m\angle A = m\angle B$	1. given
2. $m\angle B = m\angle C$	2. given
3. $m\angle A = m\angle C$	3. transitive property
4. $\angle A \cong \angle C$	4. def'n of congruent angles

QED

PUSH IT TO THE LIMIT.

Example 2:
GIVEN: $DE = EF$, $EF = DF$

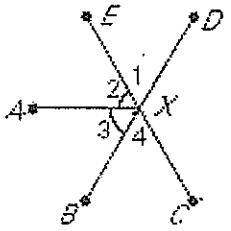
PROVE: $\overline{DF} \cong \overline{DE}$



Statements	Reasons
1. $DE = EF$	1. Given
2. $EF = DF$	2. Given
3. $DE = DF$	3. Transitive
4. $DF = DE$	4. symmetric
5. $\overline{DF} \cong \overline{DE}$	5. def'n $\cong$ segments

QED

Example 3:
Given $m\angle 2 = m\angle 3$, $m\angle AXD = m\angle AXC$
Prove $m\angle 1 = m\angle 4$



Statements	Reasons
1. $m\angle AXC = m\angle AXD$	1. given *write on yellow list
2. $m\angle AXD = m\angle 1 + m\angle 2$	2. angle addition postulate
3. $m\angle AXC = m\angle 3 + m\angle 4$	3. angle addition postulate
4. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4$	4. substitution
5. $m\angle 2 = m\angle 3$	5. given
6. $m\angle 1 + m\angle 3 = m\angle 3 + m\angle 4$	6. substitution
7. $m\angle 1 = m\angle 4$	7. subtraction prop of =

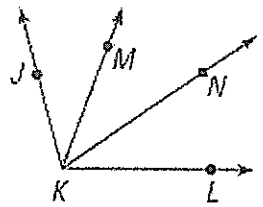
QED

1.
Given $BC = AB$
Prove $AC = AB + AB$

Statements	Reasons
1. $BC = AB$	1. given
2. $AC = AB + BC$	2. segment addition post.
3. $AC = AB + AB$	3. substitution

QED

2.
Given: $\overline{KM}$ bisects $\angle JKN$, $\overline{KN}$ bisects $\angle MKL$
Prove: $m\angle JKM = m\angle NKL$



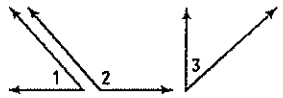
Statements	Reasons
(1) KM bisects $\angle JKN$, KN bisects $\angle MKL$	(1) Given
(2) $\angle JKM \cong \angle MKN$	(2) def'n of angle bisector
(3) $\angle MKN \cong \angle NKL$	(3) def'n of angle bisector
(4) $\angle JKM \cong \angle NKL$	(4) transitive prop

PUSH IT TO THE LIMIT.

3.

GIVEN ▶ $\angle 1$ and $\angle 2$ are supplements.
$\angle 3$ and $\angle 2$ are supplements.

PROVE ▶ $\angle 1 \cong \angle 3$

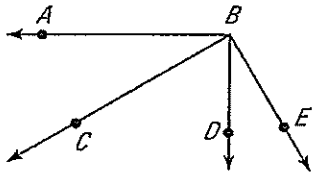


Statements	Reasons
1. $\angle 1$ and $\angle 2$ are supplements. $\angle 3$ and $\angle 2$ are supplements.	1. given
2. $m\angle 1 + m\angle 2 = 180°$ $m\angle 3 + m\angle 2 = 180°$	2. def'n of supp angles
3. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	3. substitution
4. $m\angle 1 = m\angle 3$	4. subtraction
5. $\angle 1 \cong \angle 3$	5. def'n of congruent segments

4.

GIVEN ▶ $\angle ABD$ is a right angle.
$\angle CBE$ is a right angle.

PROVE ▶ $\angle ABC \cong \angle DBE$

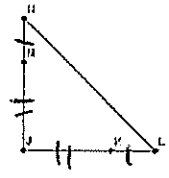


Statements	Reasons
1. $\angle ABD$ is right $\angle$	1. given
2. $\angle CBE$ is right $\angle$	2. given
3. $\angle ABC + \angle CBD = \angle ABD$	3. angle addition postulate
4. $\angle CBD + \angle DBE = \angle CBE$	4. angle addition postulate
5. $\angle ABD \cong \angle CBE$	5. def'n congruent angles
6. $\angle ABC + \angle CBD = \angle CBD + \angle DBE$	6. substitution
7. $\angle ABC = \angle DBE$	7. subtraction

5)

Given: $\overline{LK} \cong \overline{NM}, \overline{KJ} \cong \overline{MJ}$

Prove: $\overline{LJ} \cong \overline{NJ}$



Statements	Reasons
1. $\overline{LK} \cong \overline{NM}, \overline{KJ} \cong \overline{MJ}$	1. given
2. $LK = NM$ $KJ = MJ$	2. Def. of congruent segments
3. $LK + KJ = NM + MJ$	3. addition prop
4. $LK + KJ = LJ$ $NM + MJ = NJ$	4. Segment Addition Postulate
5. $LJ = NJ$	5. substitution
6. $\overline{LJ} \cong \overline{NJ}$	6. def'n congruent segments

PUSH IT TO THE LIMIT.

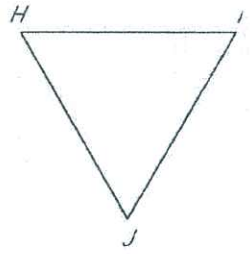
33

HW#~~38~~ 44H: Two Column Proofs
Honors Geometry
Due Date: Tuesday, Nov.13th, 2012

Name: _____ TP: _____

Failure to show work on all problems or use complete sentences will result in a LaSalle.

1. **GIVEN:** $HI = 9$, $IJ = 9$, $\overline{IJ} \cong \overline{JH}$
PROVE: $\overline{HI} \cong \overline{JH}$

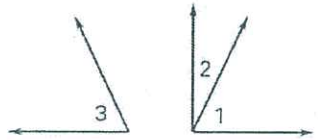


Statements	Reasons
1. $HI = 9$	1. given
2. $IJ = 9$	2. given
3. $HI = IJ$	3. substitution
4. $\overline{HI} \cong \overline{IJ}$	4. def'n $\cong$ seg
5. $\overline{IJ} \cong \overline{JH}$	5. given
6. $\overline{HI} \cong \overline{JH}$	6. ~~transitive~~

1

2. **GIVEN:** $\angle 3$ and $\angle 2$ are complementary.
$m\angle 1 + m\angle 2 = 90°$

PROVE: $\angle 3 \cong \angle 1$



Statements	Reasons
1. $\angle 3$ and $\angle 2$ are complementary	1. given
2. $m\angle 1 + m\angle 2 = 90°$	2. given
3. $m\angle 3 + m\angle 2 = 90°$	3. def'n comp $\angle$'s
4. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	4. substitution
5. $m\angle 1 = m\angle 3$	5. subtraction
6. $\angle 1 \cong \angle 3$	6. def'n cong. angles

2 3

3. **GIVEN:** $AL = SK$
PROVE: $AS = LK$

Statements	Reasons
1. $AL = SK$	1. given
2. $LS = LS$	2. reflexive
3. $AL + LS = SK + LS$	3. add prop of =
4. $AL + LS = AS$	4. seg + post
5. $SK + LS = LK$	5. seg + post
6. $AS = LK$	6. substitution

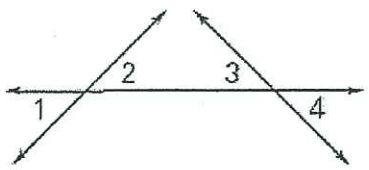
4 5

PUSH IT TO THE LIMIT.

4.

GIVEN: $\angle 2 \cong \angle 3$

PROVE: $\angle 1 \cong \angle 4$



Statements	Reasons
1. $\angle 2 \cong \angle 3$	1. given
2. $\angle 3 \cong \angle 4$	2. vertical angles
3. $\angle 2 \cong \angle 4$	3. transitive
4. $\angle 1 \cong \angle 2$	4. vertical
5. $\angle 1 \cong \angle 4$	5. transitive

5. At what point does the line $y = -2x + 2$ cross the x-axis? $y=0$

$0 = -2x + 2$

$-2 = -2x$

$x = 1$

(1,0)

6. Solve for x in the following equation:

$y = x^2 + 3w$

$\sqrt{y - 3w} = x$

7. What are the roots of the equation $x^2 - 3x = 18$?

$x^2 - 3x - 18$

$(x+3)(x-6)$

$x = -3, 6$

8. $x = \{-2, 4\}$ is a solution set for what quadratic equation?

$(x+2)(x-4)$

$x^2 - 2x - 8$

9. A circle has a circumference of 10π centimeters. What is the area of that circle, in terms of π?

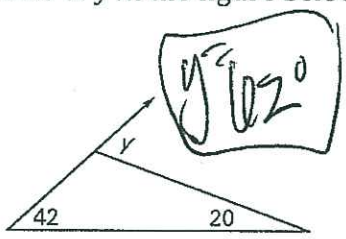
$C = 10\pi$

$d = 10$

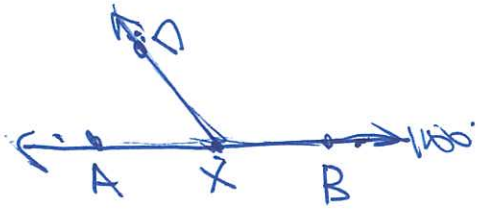
$r = 5$

$A = 25\pi \text{ cm}^2$

10. Find the value of y in the figure below:



$y = 102^\circ$



PUSH IT TO THE LIMIT.

CW#34H

Classwork 47 CW#29H

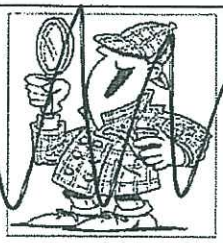
Two-column proofs

Name: Answer Key

Period: Date:

CRS	Geometry Content
Objective	5.9 Write a two column proof
Critical Thinking	**Reasoning and Argumentation:** Construct well-reasoned arguments or proofs to explain issues; Address challenges by providing a logical explanation or refutation, or by acknowledging the accuracy of the challenge

Think of writing a proof like solving a crime. You survey the crime scene, gather the facts, and write them down in your memo pad. To solve the crime, you take the known facts and, step by step, show who committed the crime. You conscientiously provide supporting evidence for each statement you make. We are not trying to "find an answer", but rather a process for which allows us to prove that something is in fact, true.

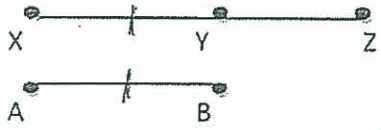


SUBSTITUTION

EXAMPLE 1:

Given: XY = AB

Prove: AB + YZ = XZ

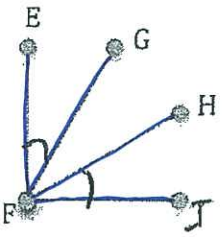


S	R
① XY = AB	① given
② XZ = XY + YZ	② segment + postulate
③ XZ = AB + YZ	③ substitution

EXAMPLE 2:

Given: $\angle EFG \cong \angle HFJ$

Prove: $\angle EFH \cong \angle GFH + \angle HFJ$

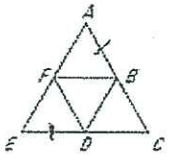


S	R
① ∠EFG ≅ ∠HFJ	① given
② ∠EFH = ∠EFG + ∠GFH	② angle addition postulate
③ ∠EFH = ∠HFJ + ∠GFH	③ substitution

1.

Given: ED = AB

Prove: EC = AB + DC



S	R
① ED = AB	① given
② EC = ED + DC	② segment addition post.
③ EC = AB + DC	③ substitution

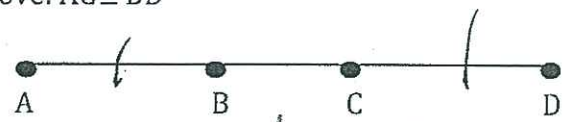
in class on friday

ADDITION

EXAMPLE 3:
Given: $WX \cong YZ$
Prove: $WY \cong XZ$

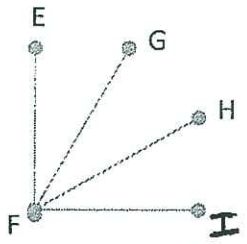
S	R
1) $WX \cong YZ$	1.) Given
2) $XY \cong XY$	2.) Reflexive
3) $WX + XY \cong YZ + XY$	3.) add. prop. of =
4.) $WY = WX + XY$ $XZ = XY + YZ$	4.) segment add. post.
5.) $WY \cong XZ$	5.) substitution

2.
Given: $AB \cong CD$
Prove: $AC \cong BD$



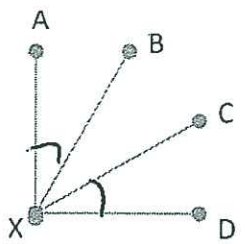
S	R
(1) $AB \cong CD$	(1) Given
(2) $BC \cong BC$	(2) Reflexive
(3) $AB + BC \cong CD + BC$	(3) add prop
(4) $AC = AB + BC$ $BD = BC + CD$	(4) segment add. prop.
(5) $AC = BD$	(5) substitution

EXAMPLE 4:
Given: $\angle EFG \cong \angle HFJ$
Prove: $\angle EFH \cong \angle GFI$



S	R
1.) $\angle EFG \cong \angle HFI$	1.) Given
2.) $\angle GFH \cong \angle GFH$	2.) Reflexive
3.) $\angle EFG + \angle GFH = \angle HFI + \angle GFH$	3.) add prop. of =
4.) $\angle EFH = \angle EFG + \angle GFH$ $\angle GFI = \angle GFH + \angle HFI$	4.) ang. add. postulate
5.) $\angle EFH \cong \angle GFI$	5. substitution

3.
Given: $\angle AXB \cong \angle CXD$
Prove: $\angle AXC \cong \angle BXD$



S	R
1.) $\angle AXB \cong \angle CXD$	1.) Given
2.) $\angle BXC \cong \angle BXC$	2.) Reflexive
3.) $\angle AXB + \angle BXC = \angle CXD + \angle BXC$	3.) add prop
4.) $\angle AXC = \angle AXB + \angle BXC$ $\angle BXD = \angle BXC + \angle CXD$	4.) ang. add.
5.) $\angle AXC \cong \angle BXD$	5.) Substitution

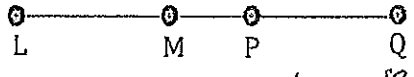
PUSH IT TO THE LIMIT.

SUBTRACTION

EXAMPLE 5:
Given: AC = BD
Prove: AB = CD

S	R
(1) AC = BD	(1) given
(2) BC = BC	(2) reflexive
(3) AC = AB + BC	(3) segment addition postulate
(4) BD = BC + CD	
(5) AB + BC = BC + CD (−BC −BC)	(5) substitution
(6) AB = CD	(6) subtraction property of =

4.
Given: LP = MQ
Prove: LM = PQ

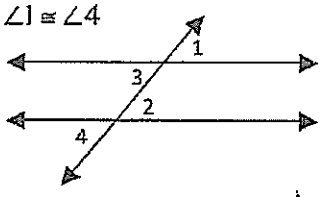


S	R
(1) LP = MQ	(1) Given
(2) MP = MP	(2) reflexive
(3) LP = LM + MP	(3) segment addition postulate
(4) MQ = MP + PQ	
(5) LM + MP = MP + PQ (−MP −MP)	(5) substitution
(6) LM = PQ	(6) subtraction prop of =

TRANSITIVE (& SYMMETRIC)

EXAMPLE 6:
Given: ∠1 ≅ ∠3
∠3 ≅ ∠2
∠2 ≅ ∠4

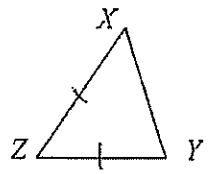
Prove: ∠1 ≅ ∠4



S	R
(1) ∠1 ≅ ∠3, ∠3 ≅ ∠2	(1) given
(2) ∠1 ≅ ∠2	(2) transitive
(3) ∠2 ≅ ∠4	(3) given
(4) ∠1 ≅ ∠4	(4) transitive

5.
Given: $XZ \cong ZY$
$ZY \cong YX$

Prove: $XZ \cong YX$



S	R
(1) XZ ≅ ZY, ZY ≅ YX	(1) given
(2) XZ ≅ YX	(2) transitive